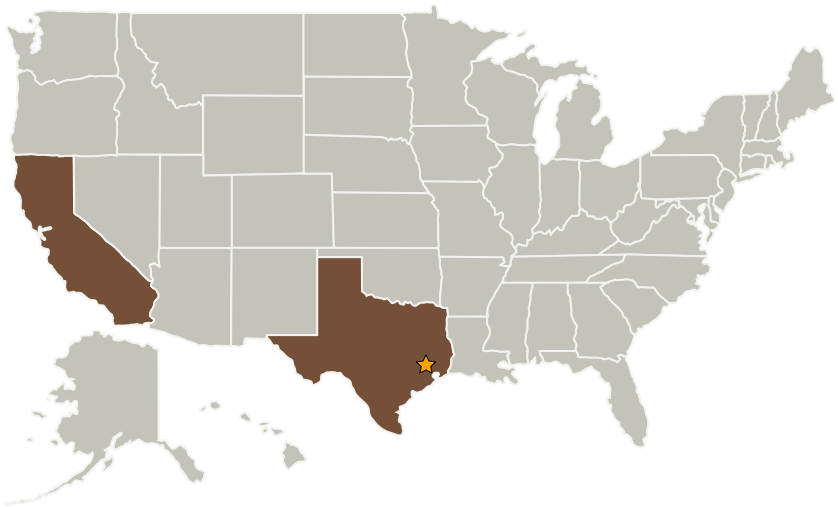
Selective Photo-Initiated Electrophoretic Separator, Phase II

Completed Technology Project (2008 - 2010)

Project Introduction

Physical Optics Corporation (POC) proposes to develop a Selective Photoinitiated Electrophoretic Separator (SPIES) System to address NASA's volatile gas separation and collection needs on the moon and Mars. It will process gas streams generated by upstream lunar in-situ resource utilization (ISRU) processes to produce purified gases such as hydrogen, oxygen, water vapor, and others that support human habitat here. The SPIES system, consisting of a series of compact (<20 cm diameter, 60 cm long, <5 kg) and energy efficient (<30 W) modules, produces highly purified gases of interest at ambient temperatures and pressures, requires no consumables, and eliminates the need for extensive downstream equipment thus, reducing equipment launch size and weight by 33%. In Phase I, POC designed and assembled a proof-of-concept prototype of technology readiness level (TRL) 4 that successfully demonstrated purification of simulated lunar ISRU hydrogen gas streams by gas separation and extraction to reduce hydrogen sulfide contamination to <1 part per million (ppm). In Phase II, POC will optimize the system design to assemble a fully functional TRL 5 SPIES system prototype that will efficiently reduce the hydrogen sulfide concentration to <1 ppm in a realistic gas stream like those generated by NASA's hydrogen reformate process.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Physical Optics Corporation	Supporting Organization	Industry	Torrance, California

Primary U.S. Work Locations	
California	Texas

Project Transitions

January 2008: Project Start

January 2010: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.3 Resource Processing for Production of Mission Consumables